

U.S. Patent Application Serial No. 10/527,699

Response filed September 30, 2008

Reply to OA dated May 30, 2008

### **REMARKS**

Claims 1-7 and 9-20 are pending in this application. Claims 1-3 and 17 are amended herein. Upon entry of this amendment, claims 1-7 and 9-20 will be pending. Entry of this amendment and reconsideration of the rejections are respectfully requested.

No new matter has been introduced by this Amendment. Support for the amendments to the claims 1-3 and 17 is as follows:

Claim 1 has been amended to replace "a palladium catalyst" in line 2 with -- Pd(0) --, such that the recited catalyst composition comprises "a crosslinked organic polymer compound and Pd(0), ...." Support for this amendment may be found, for example, in original claim 2, which recited that the palladium catalyst is Pd(0) or a salt of Pd(II).

Claim 1, line 5, has been amended to replace "the palladium catalyst" with --a palladium catalyst--, since this is the first appearance of the term. Claim 2 has been amended to recite "the palladium catalyst is derived from Pd(0)." Method claim 17 has been amended to recite "a palladium catalyst derived from Pd(0)." Support for these amendments may be found, for example, on page 4, line 19, of the specification.

Claim 3 has been amended to depend from claim 1.

**Claim 1 is objected to because of informalities.** (Office action paragraph no. 1)

The Examiner states that "the monomer" in line 11 and in line 49 should each be --a monomer--. Claim 1 has been amended as suggested by the Examiner.

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**Claim 15 is objected to under 37 CFR §1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.** (Office action paragraph no. 2)

The objection to claim 15 is respectfully traversed.

The Examiner states that the structural limitations of claim 15 are the same as those of claim 14, from which it depends. Applicant respectfully disagrees. Claim 14 allows component (III) to be either an acrylic acid type monomer or a monomer containing a hydroxyalkyl group having at least one oxygen atom and a polymerizable double bond. That is, component (III) in claim 14 need **not** meet the limitation of containing a hydroxyalkyl group having at least one oxygen atom and a polymerizable double bond. Claim 15 requires component (III) to meet this limitation, thereby further limiting claim 14.

**Claims 1-4, 6, 7, 9, 12 and 13 are rejected under 35 U.S.C. §102(e) as being anticipated by Kirk et al. (U.S. 6,743,873).** (Office action paragraph no. 4)

The rejection is overcome by the amendment to claim 1. As explained above, claim 1 has been amended to replace "a palladium catalyst" with -- Pd(0) --, such that the recited catalyst composition comprises "a crosslinked organic polymer compound and Pd(0), ...."

The Examiner states that Kirk et al. discloses a process involving incorporation of an epoxy group into a polymer chain, that the polymer is used as a catalyst support, and that the metal

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component is a Pd(II) compound (citing column 9, lines 5-16). The Examiner states that the catalyst of Kirk et al. "is substantially the same as that recited in the instant claims ...," and that "the difference between the catalyst in Kirk et al. and that recited in the instant claims lies in the method of preparation of the catalyst."

However, claim 1, as amended, requires the catalyst composition to comprise a crosslinked organic polymer compound and Pd(0). Kirk et al. discloses a palladium catalyst, but does not disclose Pd(0). The present claims, as amended, are therefore not anticipated by Kirk et al.

Applicant again notes that the method of production of the catalyst composition of the present invention is different from that of Kirk et al., resulting in a composition that is different from that of the reference. Applicant again refers to the evidence in the Declaration under 37 CFR 1.132, filed with the Amendment of January 2, 2008. The Declaration describes the production of a catalyst composition according to the method Kirk et al., made from PdCl<sub>2</sub>. In particular, the data in the Declaration demonstrate that the catalyst made according to the method of Kirk et al. does not catalyze a substitution reaction at an allyl position, as opposed to the present invention, which has been demonstrated to catalyze this reaction. Therefore, the composition of the present invention must be structurally different from that of Kirk et al.

Applicant also submits that there is no suggestion or motivation in Kirk et al. for Pd(0) carried on a crosslinked organic polymer. Claims 1-4, 6, 7, 9, 12 and 13, as amended, are therefore not anticipated by Kirk et al. (U.S. 6,743,873), and are also not obvious over this reference.

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**Claims 5, 10, 14 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kirk et al. (U.S. 6,743,873). (Office action paragraph no. 5)**

The Examiner cites Kirk as in the above rejection under 35 U.S.C. 102(e) of the base claims, and states that Kirk does not disclose embodiments in which crosslinked copolymer is prepared with more than one functional group containing monomer. The Examiner states that the nature of the crosslinked copolymers is not limited in the reference, and that this modification would have been obvious.

The rejection is overcome by the amendment to base claim 1, which has been amended to recite that the catalyst composition comprises a crosslinked organic polymer compound and Pd(0). As discussed above, Kirk et al. does not disclose or suggest the composition comprising Pd(0) of base claim 1, and the data in the Declaration under 37 CFR 1.132 demonstrate that the present invention has properties different from those of the catalyst of Kirk et al., and therefore must be structurally different.

**Claims 1-4, 6, 7, 9, 12 and 13 are rejected under 35 U.S.C. §102(b) as being anticipated by Charmot et al. (U.S. 4,943,482). (Office action paragraph no. 6)**

Reconsideration of the rejection is respectfully requested in view of the amendments to the claims.

The Examiner states that since Charmot et al. discloses particles of crosslinked polymer metallized on the surface with at least one zero valent metal and the polymer comprising 20-70 wt%

of at least one noncomplexing monoethylenic monomer and up to 10 wt% of at least one ethylenically unsaturated carboxylic acid., and palladium, the catalyst of Charmot et al. is substantially the same as that recited in claims 1-4, 6, 7, 9, 12 and 13).

However, as the Examiner acknowledged, the method of preparation of the catalyst composition in Charmot et al. is different from that in the present invention. That is, the catalyst composition of the present invention is obtained by carrying a palladium catalyst on a straight chain organic polymer and then subjecting a crosslinkable functional group in a deposited composition to a crosslinking reaction, while the catalyst composition in Charmot et al. is obtained by carrying a catalyst directly on a crosslinked polymer. Palladium in the catalyst composition in Charmot et al. is strongly influenced by the interaction of the functional group due to carrying the palladium catalyst directly on the crosslinked polymer having a functional group. As mentioned above, such a catalyst composition cannot give the catalyst effect in the substitution reaction at the allyl position, since the valence of the palladium can not change freely. Therefore, the catalyst compositions in Charmot et al. and in the present invention are clearly different and claims 1-4, 6, 7, 9, 12 and 13 are not anticipated by Charmot et al.

Moreover, there is no suggestion in Charmot et al. for the use of Pd(0), and the effects associated with the present invention are clearly unexpected over Charmot et al. Claims 1-4, 8, 7, 9, 12 and 13 are therefore also not obvious over Charmot et al.

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**Claims 1-7 and 9-17 are rejected under 35 U.S.C. §102(a) as being anticipated by Okamoto et al. (U.S. 2002/0045708). (Office action paragraph no. 7)**

**Claims 1-7 and 9-17 are rejected under 35 U.S.C. §102(e) as being anticipated by Okamoto et al. (U.S. 6,716,792). (Office action paragraph no. 8)**

Applicant notes that Okamoto et al. '708 and Okamoto et al. '792 correspond to the same application, and therefore the two rejections are addressed here together.

Reconsideration of the rejection is respectfully requested.

With reference to Okamoto et al. '708, the Examiner cites Okamoto et al. as disclosing a metallic Lewis acid composition comprising a metallic Lewis acid carried on a crosslinked polymer formed by mixing non-crosslinked polymer with metal compound and then crosslinking the polymer (citing the abstract, claims 1-23). The Examiner cites paragraph [0124] and claims 20-23 as showing exemplary copolymers meeting the limitations of claim 1, and cites palladium as being the Lewis acid in paragraph [0128].

However, paragraph [0128] lists a large number of possible metallic Lewis acids, of which palladium is only one possibility. The Examples in the references appear to use osmium. The references are clearly not anticipatory for the use of palladium. Moreover, as amended, base claim 1 requires Pd(0), and the references do not disclose Pd(0). The references do not anticipate the present claims.

Applicant further submits that there is no suggestion in Okamoto et al. for Pd(0) carried on a crosslinked polymer. Okamoto et al. relates to a metal oxide or metallic Lewis acid composition

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comprising the metal oxide or the metallic Lewis acid carried on a crosslinked polymer, and neither suggests nor discloses the catalyst composition where metal itself such as Pd(0) is carried on a crosslinked polymer. Applicant submits that there is no suggestion in the general art that Pd(0) can be carried on a crosslinked polymer. In addition, the effects resulting from the present invention, which is higher activity of Pd(0) than conventional ones and safe use and storage for a long period of Pd(0), are unexpected over the references. Claims 1-7 and 9-17 are therefore also not obvious over the Okamoto references.

**Claims 18 and 19 are rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto et al. (U.S. 2002/0045708) in view of Kobayashi (JP 2002-253972).** (Office action paragraph no. 9)

Reconsideration of the rejection of claims 18 and 19 is respectfully requested.

With regard to the rejection over Okamoto et al. and Kobayashi, the Examiner cites Okamoto as above, and states that Okamoto does not disclose the synthetic utility of palladium-based catalysts. Kobayashi is cited as disclosing polymer-encapsulated palladium catalysts prepared in a similar manner to those in Okamoto.

The Examiner states, with respect to claim 18, that Kobayashi discloses polymer encapsulated palladium catalysts prepared by homogenizing polymer and a palladium(0) complex much in the same manner as that described in the invention of Okamoto et al, and it would have been

obvious to one having ordinary skill in the art to use a palladium phosphine complex, as per Kobayashi, in lieu of a palladium carbonyl complex suggested in Okamoto et al.

However, as mentioned above, the catalyst composition in Okamoto et al. comprises a metal oxide or a metallic Lewis acid. Naturally, a metallic catalyst used in the method of preparation of the catalyst composition is a metal oxide or a metallic Lewis acid. On the other hand, in the method of preparation of the catalyst composition of the present invention, a palladium catalyst used is derived from Pd(0). Then, the palladium catalysts used in the present invention and Okamoto et al. are clearly different. That is, a metal oxide or a metallic Lewis acid itself is carried on a crosslinked polymer in Okamoto et al., and the method of preparation of the catalyst composition in Okamoto et al. is different from that in the present invention where Pd(0) is physically carried on a crosslinked polymer. Further, since Okamoto et al. neither suggests nor discloses Pd(0), carrying Pd(0) on a crosslinked polymer can not be expected from Okamoto et al. On the other hand, Kobayashi et al. discloses only the method for carrying a metallic catalyst directly on a polymer having an aromatic substituent group, though it discloses Pd(0). That is, it neither suggests nor discloses a method where a non-crosslinked polymer is mixed with metal compound, and then the polymer is crosslinked. Thus, there is no motivation in Okamoto et al. and Kobayashi et al. that Pd(0) is carried on a crosslinked polymer by carrying a palladium catalyst on a polymer compound once, and then subjecting it to a crosslinking reaction. Further, the Examiner states it would have been obvious to use a palladium phosphine complex, as per Kobayashi, in lieu of a palladium carbonyl complex suggested in Okamoto et al. However, as mentioned above, carrying Pd(0) on a crosslinked polymer



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can not be expected over Okamoto et al. Additionally, Kobayashi et al. discloses a method where a metallic catalyst coordinated by a ligand itself is carried on a polymer having an aromatic substituent group, and neither suggests nor discloses a method where a metal itself such as Pd(0) is carried on a polymer. Thus, there is no suggestion in the references for carrying Pd(0) on a crosslinked polymer. Therefore, the method for producing the composition disclosed in claim 18 is not obvious over the references.

The Examiner states, with respect to Claim 19, that it would have been obvious to one having ordinary skill in the art to use the catalyst of Okamoto et al. for carrying out allylic substitution, and since Kobayashi teaches use of palladium catalysts for this purpose, one having ordinary skill in the art would have expected the catalyst of Okamoto et al. to work with a high degree of success.

However, as mentioned above, the catalyst composition of the present invention where Pd(0) is physically carried on a crosslinked polymer is not suggested by Okamoto et al. and Kobayashi et al. Therefore, the method for performing a substitution reaction at an allyl position disclosed in claim 19 is not obvious.

**Claim 20 is rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto et al. (U.S. 2002/0045708) in view of Kaneda et al. (JP 2002-275116).** (Office action paragraph no. 10)

The rejection is overcome by the assertion of the claim for foreign priority of JP 2002-266798, filed on September 13, 2002. The claim for foreign priority is perfected by the attached

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verified translation of the priority document. Applicant submits that the priority document supports the present claims based on [claim 19] and paragraph [0215] in the priority document.

Kaneda et al. JP'116 was published September 25, 2002, and is prior art under 35 U.S.C. 102(a). The Kaneda et al. reference is removed as prior art by the perfection of the claim for foreign priority, thereby overcoming the rejection.

**Claims 1-10 and 12-19 are rejected under 35 U.S.C. §102(a) as being anticipated by Akiyama et al. (*J. Am. Chem. Soc.*, 2003, 125, 3412-3413). (Office action paragraph no. 11)**

The rejection is overcome by the assertion of the claim for foreign priority of JP 2002-266798, filed on September 13, 2002. The claim for foreign priority is perfected by the attached verified translation of the priority document. Applicant submits that the priority document supports the present claims based on claims in the priority document.

Although Applicant is uncertain of the exact date of publication of Akiyama et al., this reference was published in 2003, after the priority date of the present application. Akiyama et al. is apparently prior art only under 35 U.S.C. 102(a), and is removed as prior art by the perfection of the claim for foreign priority.

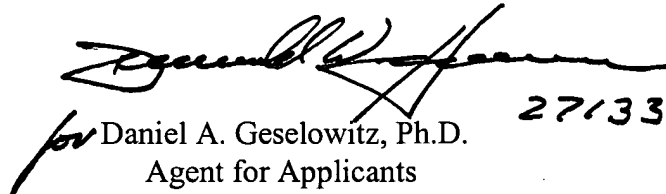
If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact the applicants' undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

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In the event that this paper is not timely filed, the applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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Enclosures: Petition for Extension of Time  
Verified translation of priority document, JP2002-267798

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